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Physical Dating Violence: the potential understating value of a bi-factorial model

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Título: Violencia física en la pareja adolescente: la potencialidad interpretativa de un modelo bifactorial.

Resumen: Estudios nacionales e internacionales establecen la Conflict Tactics Scale (CTS, Straus, 1979; 1996) como una de las medidas más utilizada para la valoración de las estrategias desarrolladas ante situaciones conflictivas en la pareja adolescente, sin embargo, aún no existe acuerdo en cuanto a la estructura interna que comporta. Concretamente, para la escala de comportamientos agresivos de carácter físico han sido identificadas indistintamente estructuras monofactoriales y bifactoriales. El objetivo de este trabajo ha sido el desarrollo y validación con análisis factorial confirmatorio (CFA) de una escala de violencia física en el contexto de la pareja adolescente, considerando las diferencias en función del sexo y rol de implicación. Utilizando un muestreo aleatorio estratificado fueron entrevistados 3258 adolescentes (15-21 años) utilizando una adaptación de la CTS. Los resultados apuntaron que, si bien no es posible identificar un modelo único que ajuste, la tendencia apunta tanto en agresión como en victimización, y en chicos como en chicas, hacia modelos bifactoriales que establecen diferencias entre comportamientos agresivos leves y graves, estando éstos, no obstante, correlacionados. Estos resultados se discuten en términos de la potencialidad interpretativa de esta estructura bifactorial para la comprensión del fenómeno.

Palabras clave: Análisis factorial confirmatorio (CFA); Agresión física; Conflict Tactics Scale, Straus; Violencia en relaciones de pareja adolescente.

Abstract: National and international studies have pointed out Conflict Tactics Scale (CTS, Straus, 1979, 1996) as one of the most widely used measures for assessing the strategies used in situations of conflict within young couples. Nevertheless, there is not any conclusive result about its structure. Especially the physical dating violence scale has undergone several structural analyses providing monofactorial and bifactorial structures. The aim of this study was focusing on the validation of structural models using confirmatory factorial analysis (CFA) of CTS within adolescent couples, considering the differences between boys and girls and between aggressors and victims. 3258 adolescents, aged 15- 21, were selected using a stratified random sample and interviewed using an adaptation of the CTS questionnaire. The results pointed out that it is not possible to identify a single model fit, but boys and girls, aggressor and victims, have the same pattern: a bifactorial model which establishes different but correlated moderate aggressive behaviors and severe aggressive behaviors. These results are discussed in terms of the potential value of this two-factor structure for understanding the phenomenon.

Key words: Confirmatory factorial analysis (CFA); Physical aggression; Conflict Tactics Scale, Straus; Dating violence.

Introduction

Over the last few decades the scientific community has become increasingly interested in the violence dynamics manifested in the early stages of adolescent dating, and numerous studies have been carried out to analyze different aspects of how this phenomenon arises and evolves and assess its consequences (Feiring, Simon and Cleland, 2009; Garrido-Genovés and Casas-Tello, 2009; Lewis and Fremouw, 2001; Muñoz-Rivas, Graña, O'Leary and González, 2007; O'Leary and Smith-Slep, 2003, and others). Although these studies have looked at violence of all types - verbal, sexual, coercive, relational and physical - most of the resulting literature has focused on physical violence (Capaldi and Owen, 2001; O'Donohue, Downs and Yeater, 1998; Rothman et al., 2011; Timmons and Slep, 2009), probably because of its unexpectedly high prevalence. The data collected is alarming, revealing aggression levels of 31% and 26% respectively for boys and girls (Simon, Miller, Gorman-Smith, Orpinas and Sullivan, 2010), but a number of studies have urged caution when evaluating this prevalence, drawing attention to the variety of types of aggression that may be covered under the single construct of "physical violence" and their relative sig-

nificance taking into account other background variables. Levels of violence (mild/moderate versus severe), frequency of involvement (sporadic versus frequent), prior circumstances and the subsequent impact on victims are all crucial factors which must therefore be addressed in any study of violence in early adolescent dating relationships (Sanchez, Ortega-Rivera, Ortega and Viejo, 2008; White, Smith, Koss and Figueredo, 2000).

One of the most commonly used measuring tools for evaluating strategies adopted to handle conflict between adolescent dating partners, both in Spain and at international level, has been the *Conflict Tactics Scale* (CTS, Straus, 1979) (Aguirre and García-Quiroga, 1997; Connolly, Pepler, Craig and Taradash, 2000; González and Santana, 2001; Kinsfogel and Grych, 2004; Muñoz-Rivas, et al., 2007; Sanchez et al., 2008; and others). This instrument has been used with different cultures, countries and target groups (Straus, Hamby, Money-Mc-Coy and Sugarman, 1996).

The theoretical model on which it is based - known as the Catharsis Theory of Violence Control (Straus, 1974; 1979), also referred to by other authors as the Hydraulic Model (Bandura and Walters, 1963) and the Ventilation Theory (Berkowitz, 1973) - hinges on the controlled expression of aggressiveness as a means of preventing uncontrolled aggressive conduct caused by the repression of initially assertive responses. The scale's internal factor structure was designed to ensure a correct analysis of this premise by considering three types of response - negotiation, verbal aggression and physical aggression - articulated as a rising scale of in-

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creasingly violent conduct, starting out with the controlled, argumentative resolution of a conflict and ending with severe physical violence. A set of 18 two-way items assessed victimization and aggression levels, with a five-point Likert-type scale representing the frequency with which men and women were involved in each type of conduct as a means of conflict resolution during arguments with their partners.

Following criticism for its shortcomings when used with adolescents, its underestimation of indirect aggression as opposed to direct aggression and of male violence as opposed to female violence, its overlooking of aspects like sexual coercion and its failure to differentiate moderate violence from severe violence in each scale (González and Santana, 2001; Ryan, Frieze and Sinclair, 1999; White et al., 2000), the original instrument was revised and modified by its authors. The *Revised Conflict Tactics Scale* (CTS2, Straus et al., 1996) made good some of the failings of the earlier version, conserving its main features and adding new scales to cover sexual coercion and violence. Straus et al. (1996) pointed out that although in the original version of the physical violence scale it was in fact possible to differentiate between those items which indicated moderate physical aggression and those which indicated severe physical aggression, the CTS2 made this differentiation more functional by adding and correcting the relevant items and converting the scale, in the authors' own words, into a "two-factor scale".

However, the few international studies to have analyzed the scale's internal structure have obtained divergent results, some identifying it as a single-factor structure and others as a two-factor structure (Cascardi, Avery-Leaf, O'Leary and Slep, 1999; Nocentini et al., 2011; Straus, 1979, 1996). In Spain, the CTS and CTS2 physical aggression scales have been satisfactorily translated and validated (Hinshaw and Forbes, 1993; Muñoz-Rivas et al., 2007; Montes-Berges, 2008), although some discrepancies still exist regarding their internal structure: by some it is considered a two-factor scale (Muñoz-Rivas et al., 2007) and by others a single-factor scale (Montes-Berges, 2008). This disagreement may be explained by methodological differences – in particular the use of confirmatory factor analysis (*CFA*) as opposed to exploratory factor analysis (*EFA*) – but it might also reflect differences to do with the actual sample groups being studied (cultural aspects, gender, age, etc.). Nocentini, Menesini and Pastorelli (2011) argue that, from a semantic point of view, a two-factor structure would indicate the existence of a clearly established dynamic which differentiates severe violent conduct from more moderate forms of violence (although the two forms also correlate), whereas a single-factor structure would indicate co-occurrence of the two: that is to say a dynamic in which moderate and severe forms of violence take place together, indistinctly.

In an exploratory factor analysis carried out with 150 Spanish students aged around 20, Montes-Berges (2008) found a single-factor structure encompassing all levels of physical violence on the CTS2 scale, but Muñoz-Rivas et al. (2007), in their *CFA* study of young Spaniards between the

ages of 16 and 26, concluded that the physical violence scale had a two-factor structure and was able to differentiate between moderate and severe violence. This second study, however, did not take into account possible differences stemming from the sex of the people in the sample group: boys and girls were studied together and very low frequencies were reported in the most severe items on the scale.

These differences, and the fact that in Spain there does not yet exist a theory-based model adapted to take into account the sex of the people involved, make it difficult to study the internal structure of this type of violence in any depth. The objective of this paper is therefore to focus on the use of *CFA* to develop and validate CTS models for physical victimization and aggression within adolescent dating relationships, taking into account differences between boys and girls.

Our point of reference is a recent transcultural study carried out by Nocentini et al. (2011) with *CFA* which analyzed the internal structure of a version of the CTS physical aggression scale. In this study, the questionnaire was first adapted to eliminate some of the more severe items which earlier works had shown to have a low level of frequency and to reformulate others. They then tested two different factor structures. The first was a single-factor structure with one single scale of physical violence saturated by all the items, and the second was a two-factor structure which differentiated between moderate aggression and severe aggression. The single-factor aggression models showed a better fit for both boys and girls, separately, and the structure was invariant between Italy and Canada. Their study produced no results for victimization.

Method

Sample

We surveyed 3,258 adolescents (48.6% boys; 51.4% girls) between the ages of 15 and 21 attending secondary schools in Andalusia, Spain. The sample group was stratified, the sample unit being the school. This initial sample group was filtered to select only those boys and girls who had previously had or who were presently involved in a dating relationship at the time the data was gathered. The definitive sample group comprised 2,687 adolescents (45.8% boys; 54.2% girls; average age = 16.85; *SD* = 1.24). Most of the adolescents lived in two-parent families (86.1%), while 12.9% of them lived with only one of their parents (11.0% with the mother; 1.9% with the father). 83.7% of them also lived with one or more siblings. Approximately half of the parents had completed basic education (43.3% and 45.6% of fathers and mothers respectively), while 26.1% of fathers and 22.6% of mothers had completed studies at university. With regard to work, 37.2% of the fathers were employed in some kind of trade or profession while most of the mothers (47.1%) were housewives.

Instruments

The students were surveyed during school hours by trained, external researchers using a self report questionnaire filled out in class. Authorization had previously been obtained from the families and the schools involved. Since this study formed part of a broader project, the instruments employed covered a range of topics related to youth and school violence. Two sessions were needed to complete the survey, neither of which exceeded one hour in duration. The adolescents were assured that all information they gave would remain anonymous, and were asked to answer the questions individually.

An adapted version of the physical violence scale in the *Conflict Tactics Scale* (CTS: Straus, 1979) was used. Following in the footsteps of earlier studies at national (Menesini, No-

centini, Ortega-Rivera, Sanchez and Ortega, 2010; Sanchez et al., 2008; Sanchez, Viejo and Ortega, 2011) and international (Connolly et al., 2010; Nocentini et al., 2011) level, the version of the scale used was adapted to take into account the specific characteristics of adolescent dating relationships. It conserved three of the original items (1, 6 and 8); slightly modified two items (5 and 7); considerably altered two items (item 4 included new actions and item 9 unified two of the original items); added two new items (2 and 3); and eliminated two items which had shown an excessively low level of frequency in earlier studies (see Table 1). The final scale comprised 9 two-way items (aggression and victimization) that measured the frequency of adolescent involvement in different types of physical violence on a five-point Likert-type scale.

Table 1. Modifications on *Conflict Tactics Scale* (Straus, 1979; 1996)

<i>Straus, 1979 (CTS)</i>	<i>Straus, 1996 (CTS2)</i>	<i>Used version</i>
Pushed, grabbed or shoved partner	Pushed or shoved partner Grabbed partner	1.- Dar empujones y/o agarrar.
-----	-----	2.- Escupir.
-----	-----	3.- Tirar del pelo o arañar.
Slapped partner	Slapped partner	4.- Abofetear, dar patadas o mordiscos.
Beat up partner	Beat up partner	4.- <i>Abofetear, dar patadas o mordiscos.</i>
-----	Twisted partner's arm or hair	5. - Retorcer el brazo.
Threw something at partner that could hurt	Threw something at partner that could hurt	6.- Tirar, romper, golpear o dar patadas a las cosas.
-----	Slammed partner against wall	7.- Empujar o tirar contra la pared.
Kicked, bit or punched partner with something that could hurt	Kicked, bit or punched partner with something that could hurt	8.- Golpear o intentar golpear con un objeto.
Choked partner	Choked partner	9.- Intentar asfixiar o dar puñetazos.
Threatened with a knife or gun	-----	-----
Used knife or gun on partner	Used knife or gun on partner	-----

Analysis

Descriptive analyses were carried out using the SPSS statistics software version 15.0, and factor validity was analyzed with the AMOS 16.0 and MPlus statistics packages. We also assessed the potential of models presented in existing scientific literature to explain this empirical data. The Maximum Likelihood (ML) method of estimation was used because, with regard to structural equation models, this has proven reasonably resistant to the perfect non-compliance of basic premises such as multivariate normality (Hu and Bentler, 1995) and more adequate than the Weighted Least Squares Means and Variance Adjusted (WLSMV) method with 5-category polytomous variables (Beauducel and Yorck, 2006). However, taking into consideration the conclusions drawn by Rodríguez and Ruiz (2008), with a Mardia coefficient indicating a markedly non-normal multivariate distribution, the data was processed using the bootstrap method. This corrected the sampling distribution by creating a number of random samples with replacement from the original dataset

(Ledesma, 2008), thus making it possible to perform the necessary statistical calculations.

To decide which model best fitted the empirical data and bearing in mind the different hypotheses that ruled out the existence of one single criterion (Schumaker and Lomax, 2004; Kline, 2011; and others), we looked at the adequacy of each of the estimated parameters – parameters with values that, in theoretical terms, were viable and consistent with regard to sign and value, non-extreme standard error values and statistically significant estimated values – and evaluated global model fit (Byrne, 2009). Most authors argue in favor of evaluating global model fit by estimating the different indices all together (Hu and Bentler, 1995). In this case we used: a) the ratio of minimum discrepancy, or chi-squared value, the non-significance of which would indicate that the model fits the observed matrix well. Since this ratio is extremely sensitive to sample size (Field, 2009), it was basically considered for the purpose of comparing models; b) the *NFI* (Normed Fit Index) and the version of the same revised to take into account the effect of the sample size, the

CFI (Comparative Fit Index), two of the indices that have been acknowledged the longest as single indicators of fit. Their values of these indices fluctuate range from 0 to 1 and are obtained by comparing the estimated model with a null model in which there exists no dependency whatsoever between variables (in such a manner that each variable constitutes a factor in itself). A good fit is indicated by values above 0.90 (according to Bollen, 1989) or above 0.95 (according to Hu and Bentler, 1995); and c) the RMSEA (Root Mean Square Error of Approximation), which was recently recognized as one of the criteria that contribute the most data with regard to the covariance structural model. Values lower than 0.05 indicate a good fit, values between 0.05 and 0.08 indicate an acceptable fit and values above 0.08 repre-

sent a poor fit and mean that the model needs to be revised (Hu and Bentler, 1995). Finally, the value of Hoelter's critical N was considered (Hoelter's 0.1 / Hoelter's 0.5 > 200) as a statistic which focuses directly on sample size adequacy to produce an adequate chi-squared fit (Hu and Bentler, 1995).

Results

Confirmatory factor analysis was carried out separately for aggression and victimization and for boys and girls. Before that, the frequency with which the different items appeared was checked (see Table 2).

Table 2. Physical Dating violence: involvement.

	Aggression		Victimization	
	Boys (%)	Girls (%)	Boys (%)	Girls (%)
1.- Dar empujones y/o agarrar fuerte	11.5	14.4	12.5	13.0
2.- Escupir	3.9	2.4	3.3	2.4
3.- Tirar del pelo o arañar	3.5	6.8	6.3	3.1
4.- Abofetear, dar patadas o mordiscos	5.5	11.0	8.7	7.1
5.- Torcer el brazo durante una conversación	5.9	3.7	4.4	5.2
6.- Tirar, romper, golpear o dar patadas a las cosas	20.5	15.8	12.1	23.7
7.- Empujar o tirar contra la pared	4.6	4.0	4.3	5.2
8.- Golpear o intentar golpear con un objeto	5.8	5.0	4.5	6.1
9.- Intentar asfixiar o dar puñetazos durante una conversación	2.7	0.9	1.9	1.0
Aggression: N boys = 1126; N girls = 1388; No missing				
Victimization: N boys = ; N girls = ; No missing				

The results for item 9, *Intentar asfixiar o dar puñetazos durante una conversación (trying to choke partner)*, revealed a very low frequency, especially in the case of girls. It might be argued that this low level of involvement reflects the seriousness of the act itself and should therefore not be overlooked, but its low frequency values could create bias in the subsequent CFA results. It was therefore decided to validate parallel models for 9 and 8 items, eliminating item 9 so that its weight could be estimated.

Physical aggression models for boys and girls

The fit indices obtained for the explicatory models are shown in Table 3. As prescribed by Nocentini et al. (2011), the first model tested was a single-factor model with one single factor denominated *physical aggression* saturated by all the items. The second model was a two-factor solution, with the first factor, *moderate aggression*, saturated by the first six items and the second, *severe aggression*, saturated by the other 3 items (or the other 2 in the case of eight-item models).

The results showed that for girls, the theoretical models tested (model 1 and model 2) did not have good fit indices, although a relative improvement could be seen in those versions with only eight items. This lack of fit was corroborated by a Hoelster's critical N which in all cases fell short of the critical minimum of 200 (Hoelster, 1983).

The analysis was therefore approached from an exploratory perspective which made it possible to create an explicatory model for the proposed data. MPlus 4.2 statistical software was used to carry out an EFA on the polychoric correlation matrix of the variables under analysis (Holgado, Chacón, Barbero and Vila, 2010). Scree-plot analysis (Catell and Jaspers, 1967) suggested that a two-factor model may be more effective, and a two-factor solution was therefore considered using the *WLSMV* method of estimation (Muthén, Toit and Spisic, 1997). The promax-rotated solution was then analyzed. An initial examination of the data suggested that it may be convenient to eliminate item 9, which had a level of saturation lower than 0.30 in both factors. A new eight-item two-factor solution was then implemented, the results indicating a first factor comprising items 1-4 ($\alpha = .953$) and a second factor comprising items 5-8 ($\alpha = .935$). The statistics obtained ($X^2 = 13.484$, $p = .27$; $RMSEA = .013$; $RMSR = .031$), together with a common factor variance of at least 20% (a weighting equal to or higher than .45), residuals lower than .10 in all cases and inter-factor correlation of .685, showed that this solution was robust enough to withstand a confirmatory factor analysis.

This third, eight-item model (model 3) was therefore tested by CFA. Figure 1 shows the model as the best explicatory model, considering that the modification indices contributed to its optimization by expressing error correlation between items 1-6 and 6-8.

Table 3. Aggression models: fit index.

	$X^2 (p)$	df	NFI	CFI	$RMSEA$ (Lo-Ho)
<i>Girls N = 1388</i>					
Model 1 ^a	523.331 (.000)	27	.818	.825	.115 (.107 - .124)
Model 1 ^b	263.147 (.000)	20	.888	.895	.094 (.084 - .104)
Model 2 ^c	469.872 (.000)	26	.837	.844	.111 (.102 - .120)
Model 2 ^d	259.024 (.000)	19	.890	.897	.095 (.085 - .106)
Model 3 ^e	216.764 (.000)	19	.908	.915	.087 (.076 - .097)
Model 3 + 2EC ^f	118.538 (.000)	17	.950	.956	.066 (.055 - .077)
<i>Boys N = 1126</i>					
Model 1 ^a	273.827 (.000)	27	.950	.955	.090 (.081 - .100)
Model 1 ^b	158.118 (.000)	20	.961	.966	.078 (.067 - .090)
Model 2 ^c	242.917 (.000)	26	.956	.960	.086 (.076 - .096)
Model 2 ^d	136.223 (.000)	19	.967	.971	.074 (.063 - .086)
Model 3 ^e	135.814 (.000)	19	.967	.971	.074 (.063 - .086)
Model 3 + 1EC ^g	104.296 (.000)	18	.974	.979	.065 (.053 - .078)

^a Mono-factorial model with 9 items; ^b Mono-factorial model with 8 items; ^c Bifactorial model with 9 items, factors correlation .818 (girls), .955 (boys); ^d Bifactorial model with 8 items, factors correlation .934 (girls), .937 (boys); ^e Bifactorial model with 8 items (moderate physical aggression: items 1-4; severe physical aggression: items 5-8), factors correlation .847 (girls), .949 (boys); ^f Bifactorial model with 8 items with correlation among E 1-6 and 6-8, factors correlation .841; ^g Bifactorial model with 8 items with correlation among E 3-4, factors correlation .971.

The results obtained for boys showed that, given their higher level of involvement in the *Intentar asfixiar o dar puñetazos durante una conversación* (trying to choke partner) behavior item, the inclusion of this item in the models did not produce any significant amount of bias in the results. The respective indices for 9 and 8 item models were less disparate. However, Hoelter's critical N indicated better adequacy for the 8-item models, which in all cases attained scores higher than 200.

Unlike the situation with the girls, the fit indices suggested that both theoretical models could be considered explicatory but the chi-squared value showed that the fit of the two-factor model was better.

With this consideration in mind, the model for female aggression (model 3) was tested. This was a two-factor model with the *moderate aggression* factor saturated by the first four items and the *severe aggression* factor saturated by the other items. The fit indices for this model were satisfactory and very similar to those obtained for the two-factor theoretical model, with the advantage that this model offered a parallel internal structure for physical aggression for male and female aggression. Bearing in mind the modification indices, it was decided to express error correlation between items 3 and 4 (see Figure 1) – co-occurrent forms of violent conduct correlative to the scale of severity proposed by Straus (1979). This significantly improved the model fit.

Physical victimization models for boys and girls

Models for victimization were created from the same theoretical models as those used for aggression. The results obtained are shown in Table 4. The first theoretical model tested, despite having been validated only for aggression, was the one-dimensional model described by Nocentini et al. (2011). The second was the two-factor solution, with the *moderate aggression* factor saturated by items 1-6 and the *severe aggression* factor saturated by the other items.

As in the case of physical aggression, low percentages of involvement by both boys and girls in the conduct referred to in item 9, *Intentar asfixiar o dar puñetazos durante una conversación* (trying to choke one's partner), confirmed the desirability of models with parallel 9 and 8 item versions.

For boys it was the 9-item model which produced the best indices, although once again the differences between the parallel 8 and 9 item versions were not as great as they were for girls. The model showed error correlation between pairs 1-4, 3-4 and 6-7, producing adequate fit indices. Although the $RMSEA$ value was borderline for what is considered a viable model, the chi-squared value and the normalized and comparative fit indices (NFI and CFI) showed that this was the best solution as an explicatory model for empirical data on male victimization (see Figure 2).

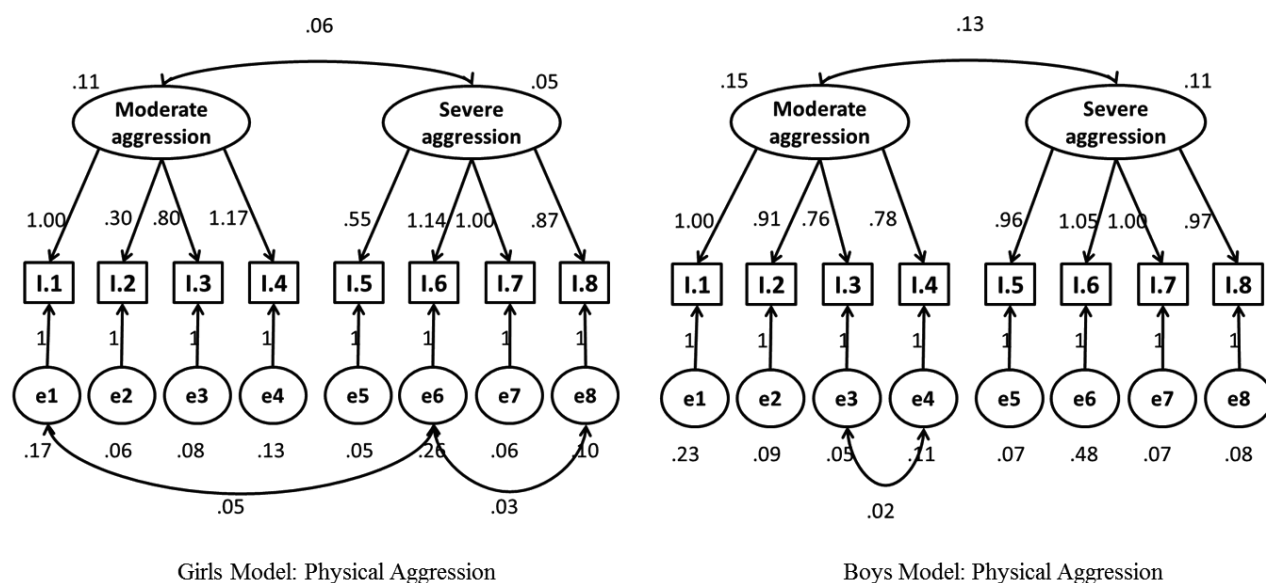


Table 4. Victimization models: fit index.

	$X^2 (p)$	df	NFI	CFI	$RMSEA (Lo-Ho)$
<i>Girls N = 1401</i>					
Model 1 ^a	411.568 (.000)	27	.864	.871	.101 (.092 - .110)
Model 1 ^b	312.178 (.000)	20	.880	.887	.102 (.092 - .112)
Model 2 ^c	391.003 (.000)	26	.871	.878	.100 (.091 - .109)
Model 2 ^d	226.020 (.000)	19	.913	.920	.088 (.078 - .099)
Model 2 +2EC ^e	146.451 (.000)	17	.944	.950	.074 (.063 - .085)
<i>Boys N = 1147</i>					
Model 1 ^a	580.727 (.000)	27	.880	.885	.134 (.124 - .143)
Model 1 ^b	382.630 (.000)	20	.897	.902	.126 (.115 - .137)
Model 2 ^c	420.656 (.000)	26	.913	.918	.115 (.106 - .125)
Model 2 +3EC ^f	190.629 (.000)	23	.961	.965	.080 (.069 - .090)
Model 2 ^d	327.049 (.000)	19	.912	.917	.119 (.105 - .124)

^a Mono-factorial model with 9 items; ^b Mono-factorial model with 8 items; ^c Bifactorial model with 9 items, factor correlation .882 (girls), .867 (boys); ^d Bifactorial model with 8 items, factor correlation .737 (girls), .895 (boys); ^e Bifactorial model with 8 items with correlation among E 1-6 and 2-8, factor correlation .699; ^f Bifactorial model with 9 items with correlation among E 1-4, 3-4 and 6-7, factor correlation .890.

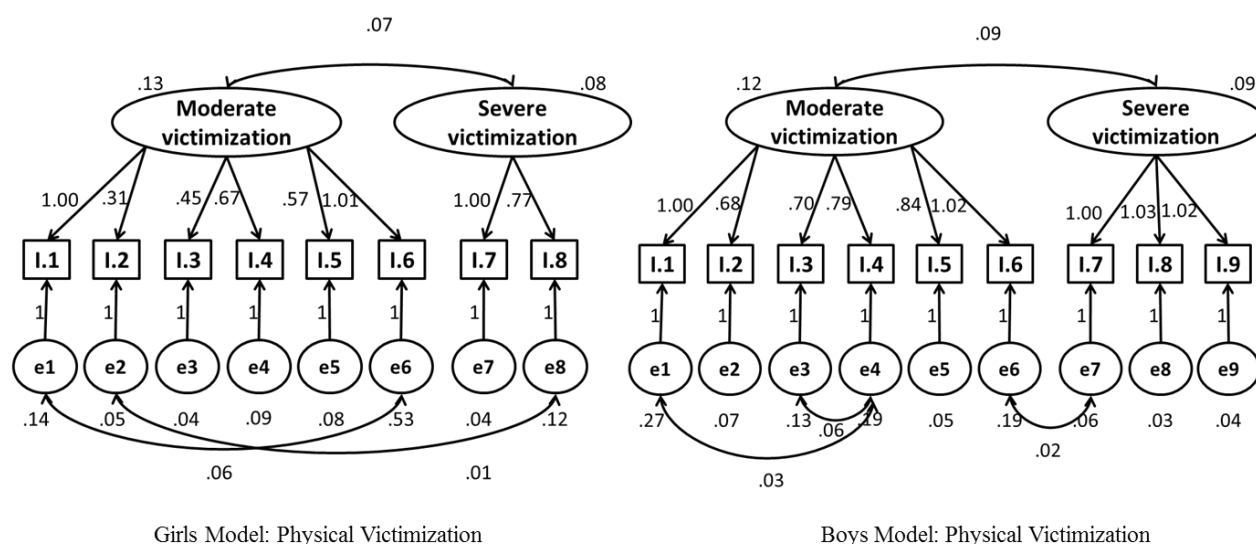


FIGURE 2

Discussion and conclusions

In view of the controversy which exists regarding the internal structure of the physical violence scale in the *Conflict Tactics Scale* (1979; 1996), this study had as its objective to analyze and validate an explicatory model for an adapted version of this scale that would take into account possible differences between boys and girls – an aspect overlooked in most other studies – and provide a deeper understanding of aggressive behavior and how it is interpreted by boys and girls.

As in other studies focusing on this line of research (Connolly et al., 2010; Nocentini et al., 2011; Sanchez et al., 2008), a version of the scale adapted for use with adolescents was used. The changes made to the original CTS scale mainly involved eliminating the more severe items, because, as has been shown in a number of studies, frequency of involvement by both boys and girls in the more severe forms of violence was very low or almost inexistent (Muñoz-Rivas et al., 2009; Sanchez et al., 2008). Our scale therefore comprised a set of nine items, of which the first eight corresponded to mild or moderate violence, as defined originally by Straus (1979) and later, in the Spanish context, by Muñoz-Rivas et al. (2007).

However, our results showed that, although we did not have one single fit model, the trend in both aggression and victimization, for both boys and girls, was towards two-factor models which differentiate between moderate aggressive conduct and severe aggression despite the fact that the two forms are correlated. Again, a very low level of involvement was found, especially among girls, in the most severe item on the scale *Intentar asfixiar o dar puñetazos durante una conversación* (trying to choke one's partner). The inclusion of this item in explicatory models therefore creates bias and leads to unreliable results, and it is preferable to use an

eight-item solution, which reflects violent behavior among adolescents much more accurately.

To validate the *aggression* models, previously validated theoretical models were first considered. Nocentini et al. (2011) described the adequacy of a single factor model for Canadian and Italian populations. This may have been influenced by the proximity of their particular adaptation of the scale to the original moderate violence factor established by Straus (1979). Cultural affinities between Italy and Spain and earlier cross-cultural studies (Menesini et al., 2011; Ortega, Sanchez, Ortega-Rivera, Menesini and Nocentini, 2010) may have shown that certain similarities between those results and the Spanish results were to be expected. However, analysis of this sample group of Spanish adolescents revealed a two-factor model which concurred with the trend proposed by Straus et al. (1996) and later validated for Spain by Muñoz-Rivas et al. (2007), although with a different structure in terms of the items in each factor and, in the case of girls, with error correlation between the different factors.

Close examination of the models obtained made it possible to identify two things of crucial importance in the two-factor theoretical models described in existing scientific literature. Firstly, items 5 and 6 (*Torcer el brazo durante una conversación* -twisting the partner's arm during a conversation- and *Tirar, romper, golpear o dar patadas a las cosas* -throwing, breaking, hitting or kicking things-, respectively) which had previously saturated the moderate violence factor (Nocentini et al., 2011) now saturated the severe violence factor, both for boys and girls. This may indicate a change of perception on the part of the adolescents because, as White et al. (2000) showed, violent conduct needs to be evaluated in-context, taking into account not only the conduct in itself but also the victim's opinion about that conduct and the factors which contributed to it. Adolescents, having become more aware of aggressive behavior and its consequences, may now be interpreting such conduct in a different way, no longer seeing it as some-

thing acceptable or as a normal part of the dating relationship dynamic but simply as undesirable, violent conduct.

This study's second contribution was to establish a single model, valid for both boys and girls, which, having first taken into account possible differences between sexes, produced one single two-factor solution that fits the structure of aggressive behavior between adolescent dating partners and explains that structure separately for both boys and girls. However, whereas the models for girls display a highly demarcated structure with regard to moderate and severe forms of aggression, those for boys fit both single-factor and two-factor structures, thus providing a less differentiated view.

Considering that no sex-differentiated theoretical models were available for physical *victimization*, and accepting the hypothesis that in violence occurring within adolescent dating relationships both aggression and victimization are generally exercised by both partners, with mutual implications within the violence dynamic (Menesini et al., 2011; Ortega and Sanchez, 2010; Whitaker, Haileyesus, Swahn and Saltzman, 2007), we chose to use structural models for aggression described in existing literature and validate them for victimization. This involved testing the transfer of their internal structure from aggression to victimization. The results obtained showed that, despite the existence of small differences based on correlations between different errors and the possibility of including item 9 *Intentar asfixiar o dar puñetazos* (trying to choke one's partner) in the model for boys, it was possible to identify a single model that fitted both boys and girls. To a large extent the models obtained for victimization

repeated the theoretical divergences found in the aggression models: the internal structure for physical victimization corresponded to two-dimensional models that differentiated between moderate and severe conduct. This time, however, the theoretical model proposed by Nocentini et al. (2011) offered a valid structure for both male and female victimization.

In view of the above considerations, our study has opened up a new line of research for the study and understanding of physical violence in adolescent dating relationships. Thanks to its detailed examination of the differences between sexes and roles, the method of selection and the size of the sample group and the statistical robustness of the analyses carried out, our results are of great interpretative potential for researchers wishing to analyze the subject in depth.

The two-factor structure may lie at the heart of an escalating pattern of aggression not only involving a transfer between physical and sexual aggression, as has hitherto been considered the case (Ryan et al., 1999), but also a transfer between moderate physical aggression and severe physical aggression in which the former may precede the latter. Although it is not possible to draw any solid conclusions in this regard from the analyses performed in this study, these aspects should nevertheless be borne in mind for those future lines of research on which prevention and action programs will be based in years to come. There can be no doubt that they may well influence the establishment and implementation of a global explicatory approach to the problem.

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